

ADVANCING BASIC EDUCATION AND LITERACY PROJECT



THE CHINA EXPERIENCE

PROVIDING TEACHER TRAINING THROUGH EDUCATIONAL TELEVISION

YIDAN WANG

ASIAN DEVELOPMENT BANK INSTITUTE



U.S. Agency for International Development • Bureau for Global Field Programs, Field Support and Research
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by Drew Tiene, Kent State University

FOREWORD

Stephen Anzalone

Education Development Center

THERE SEEMS to have been little of the last half of the twentieth century that hasn't been televised or defined in ways to make it available to television. The shaping of commerce and consumer tastes is perhaps the most obvious. But the power of television has gone much further. Across the globe, television has transformed political discourse and provides a vast arena for governance. The medium of television carves populations into generations and molds their cultures. Distant events are transformed into global happenings. Even wars between nations come to share viewership ratings with sitcoms and sporting events.

The one area that has not been so fundamentally affected by the power of television is education. With the exception of programs like *Sesame Street*, the educational potential of television has not been fully explored. Mostly, television has been a stranger in the classroom—contributing little to the teaching-learning process even when it gets turned on.

The vision that television would offer the means for a spectacular transformation of educational quality and access, held by so many in the sixties and seventies, has clearly not been realized. Especially in developing countries, where the task of educational modernization loomed large, television was seen as a potentially important agent of educational reform. During the sixties and seventies, several bold experiments were launched to bring the power of television to the agenda of educational reform. Most notable of these were in American Samoa, Ivory Coast, El Salvador, and Niger. The results proved disappointing. For the most part, television added little or nothing to improving student achievement. Costs proved higher than expected. Opposition was encountered from teachers and

sometimes from students. The boldness of the experiments made them highly visible, and the failures were not soon forgotten.

In the eighties and nineties, television continued to be left out of the international repertoire of educational reform options deemed suitable for developing countries. However, the use of television was not entirely abandoned. Applications were tried in several countries—and outside the shadow of international fanfare, showed considerably better results. Brazil undertook a number of pioneering efforts that demonstrated the usefulness of television as an educational tool. Mexico launched the *Telesecundaria* project to use television to bring secondary school education to remote communities. Today, a large proportion of Mexican students pursue their secondary school education through television.

One of the greatest success stories of this time has been China. China has used television in a nationwide effort to upgrade the capacity of its millions of teachers. The details of China's success are not as well known as they should be. In order to correct this deficiency, and to update the perspective on the potential of educational television beyond the well-known legacy of the sixties and seventies, USAID's ABEL2 project commissioned this study.

The investigation of China's experience was led by Dr. Yidan Wang, now with the Asian Development Bank Institute. She was joined by Professor Drew Tiene of Kent State University, who has written extensively on and is a successful producer of educational television. Dr. Wang undertook a review of the documentation and conducted numerous interviews with officials and teachers in China. She and Professor Tiene studied examples of the programs produced and visited localities where teachers are learning through television.

Wang has written up the findings of this investigation and Tiene prepared an afterword to situate China's experience in the context of the continuing development of television as a communications medium and an educational tool.

This discussion of China's experience compels us to take a fresh look at the possibilities offered to developing countries. It comes at a time when all countries are seeking to come to grips with the revolution in telecommunications and information technologies. With the convergence of television, computing, and telecommunications, the shape of the future for bringing the power of moving images and speaking voices into the educational process is yet to be determined. To what extent these images and voices come to us through conventional broadcasting, or by being accessed through software as part of multimedia packages, remains to be seen. Whatever the vehicle, China's experience provides much food for thought on how educational television, whatever the medium comes to look like, can be used to solve educational problems in a manner that reaches large numbers in the most rapid and cost-effective way.

Introduction

THE LATE 1970s was a time of dramatic policy change in China. With a focus on economic development, China undertook a series of economic, administrative, and educational reforms. The education sector in particular presented daunting challenges to policymakers. The most urgent problems in the sector were the lack of qualified human resources and limited financial resources (CPC Central Committee, 1985). How the country dealt with the large number of unqualified teachers is the subject of this paper. Teacher training had long been a weak link in China's education system. By 1985, two-fifths of primary teachers and nearly three-quarters of junior secondary teachers had not received appropriate preservice teacher training (DPSEDC, 1986, CTVTC).¹ For years, these unqualified but experienced teachers also lacked opportunities to improve their skills through inservice teacher training programs. Previous efforts to improve inservice teacher qualifications had met with little success. The situation called for an innovative program that could effectively train and upgrade hundreds of thousands of teachers.

In 1987, the Government established the China Television Teachers' College (CTVTC) to meet this need by offering inservice teacher training courses through educational television (ETV). Within a few years, this highly effective program had trained two million primary and junior secondary school teachers. Largely as a result of ETV training, by 1994 the percentage of unqualified teachers had dropped dramatically: at the primary level from 39 to 14 percent, and at the junior secondary level from 73 to 36 percent (Zhao, 1995). The success of the program was due to four important factors: national policy support; collaboration among national and local levels of government and teacher training institutions; a sophisticated delivery system; and well-crafted programs.

¹ In 1985, a total of 7.5 million teachers were employed to teach 173 million children in primary and junior secondary schools.

This study examines the experience of ETV and teacher training in China. The analysis is based mainly on information gathered at the CTVTC in Beijing (now the Department of Teacher Education of the Central Radio and Television University), the State Education Commission (now the Ministry of Education), and teachers' training institutions in Hebei and Shandong provinces in 1997 and 1998. The study begins by providing a context for the reform. Next, it looks at the administration and organization, curriculum and programming, and production and transmission of CTVTC programming. It goes on to analyze implementation, examining variations between the provinces and the integration of ETV with other distance education programs. It ends by looking at the program's achievements and challenges, and by offering some concluding remarks.

The project

History of educational television

THE USE OF DISTANCE EDUCATION in China can be traced back to the 1950s when the first radio and correspondence university was set up in 1958 in the Tianjin Municipality, one of the nation's largest cities. In subsequent years, radio and television universities were established in the urban areas of Beijing, Shanghai, Shenyang, and Harbin. These universities provided professional and skills training, including teaching skills for primary and secondary school teachers. However, this effort was forced to a halt in 1966 by the Cultural Revolution (Niu, Zhang, and Ji, 1994).

Until the late 1970s, conventional schools remained the primary means of training in all fields of education. Although there was a large gap between the demand and supply in education, the capacity of the education system was not really challenged until national policy shifted to economic development. This policy goal could only be realized through an educated population. During the Cultural Revolution, which had lasted ten years, the national examination system that had been used to select students based on their academic merits was abandoned. As a consequence, hundreds of millions of qualified young people had been denied opportunities for higher education. Policymakers believed that this "lost generation" could still make a contribution to economic development if offered appropriate educational opportunities. Due to the large numbers to be educated and the limited capacity of educational institutions, relying on conventional schooling was not an option.

China Central Radio and TV Universities (CRTVU) was proposed as an experiment to meet this new demand. Deng Xiaoping, then premier of China, strongly promoted the introduction of the CRTVU. He had been greatly impressed by the ability of the British Open University to train large numbers of students through the use of technology. In October 1977,

the Ministry of Education and the Central Broadcasting Bureau convened a leading group of broadcasters and educators to prepare for Television University. Less than 16 months later, CRTVU was inaugurated. The CRTVU network consisted of 28 provincial level radio and television universities, 279 prefecture/municipal branch schools, and 625 county level workstations. Via its microwave network, the CRTVU offered higher education courses in a variety of areas including industry, agriculture, liberal arts, science, teacher education, finance and the economy, law, and the arts. This included more than 200 courses offered toward teacher diploma and subject area certification or continuing education. Students were admitted through national examinations for two or three-year full-time study programs (Niu, Zhang, Ji, 1994). This opportunity for education met with enthusiastic support from the beginning. In the first year, CRTVU recruited 97,000 students. It expanded rapidly in subsequent years, and by 1985, CRTVU enrolled 273,100 students. (Zhang, 1996:160).

Increasing demand for qualified teachers

The expansion of educational television was directly related to the promulgation in 1986 of the Law on Compulsory Education (LCE), which guaranteed nine years of basic education to all children. In addition to creating a demand for many new teachers, LCE also had implications for existing teachers. Article 13 set standards for the *level* of training that would be required:

The state shall take measures to strengthen the development of teacher training institutions in order to accelerate the training of teachers and to ensure that all primary school teachers receive at least secondary teacher training and that all junior secondary school teachers receive at least tertiary teacher training. (The Sixth People's Congress, 1990:12)

The LCE had several important implications for inservice teacher training. As indicated above, about 60 percent of primary school and 27 percent of secondary school teachers were qualified according to government standards imposed by the LCE. These could benefit from upgrading training offered at existing teacher training institutions. Those who had equivalency degrees could take advantage of existing training programs at the provincial level to make up their deficiencies in the area of pedagogy and psychology. But the large majority of unqualified teachers required a much more extensive program, including both subject matter, pedagogy and educational psychology courses. The Government set 2000 as the year by which 95 percent of primary school teachers and 80 percent of secondary school teachers should reach the qualification requirements laid out in the LCE.

A variety of historical, geographic, and economic reasons account for the large number of unqualified teachers at this point in time. In the early 1970s, the teaching force was divided into two categories. Although both were full-time teachers, and often taught at the same school, they had different qualifications and sources of salaries. The *gongban* (public) teachers were those that the government recruited. The majority of *gongban* teachers had received appropriate formal teacher training for their teaching posts. However, when the demand for teachers outpaced the supply, the government also recruited individuals with equivalency degrees. At the same time, when there was a rapid increase in the number of secondary schools, many primary school teachers were promoted to fill these teaching slots without receiving any further training. In addition, some experienced substitute teachers were assigned public teaching positions without formal training. In contrast, *minban* teachers were selected and compensated by the communities in which they served. These teachers had no formal teacher training, and some had not even received equivalent diplomas. The *minban* teachers accounted for the large majority of un-

qualified teachers. Not surprisingly, most were found in primary and secondary schools at the county and township levels, or in rural areas.

Once the LCE was introduced, the demand for teachers grew so rapidly that even the government began to appoint unqualified teachers. The need was so great that primary school teachers were promoted to teach at the secondary level, and individuals without even an equivalency degree were appointed to teach at the primary level.

Before the advent of ETV, there were mainly two forms of in-service teacher training for primary and secondary school teachers—a full-time teacher-training program and correspondence training, both offered by teacher training institutions. The difference between the two programs was that the former required teachers to leave their jobs to engage in full time training, while the latter allowed teachers to continue teaching while pursuing a part-time program. Together, these training programs were not able to meet the sudden tremendous demand to bring hundreds of thousands of unqualified teachers up to standard.

The 1985 teacher crisis had several components. As indicated, about 60 percent of primary school and 27 percent of secondary school teachers were fully qualified according to the standards imposed by the LCE. These teachers could benefit from upgrading training offered at existing teacher training institutions. The remaining teachers were considered unqualified. A small number of these possessed equivalency degrees, and could take advantage of existing training programs at the provincial level to make up their deficiencies. But the large majority of unqualified teachers required a much more extensive program, including both subject matter, pedagogy, and educational psychology. The Government set 2000 as the year by which 95 percent of primary school teachers and 80 percent of secondary school teachers should reach the qualification requirements laid out in the LCE.

China Television Teachers' College

Clearly, China's new focus on economic development, together with the LCE, called for a massive education program, and this created a great demand for teacher training. Aside from the enormous number of new teachers that would be needed, the LCE would require extensive training for many existing unqualified teachers. How to meet this need in the most cost-efficient way was a major concern.

With the success of CRTVU uppermost in their minds, the government created the CTVTC in 1987. The State Education Commission, which oversaw the CRTVU, assumed responsibility for the CTVTC. However, the new organization maintained a separate structure, staff, and administrative system. According to Lu, Zhang, Hu, and Zhou (nd), the CTVTC's tasks included:

- providing diploma education to academically unqualified teachers (targeting those teachers who had not received an equivalency degree or who lacked training in certain subject areas);
- upgrading the professional skills of teachers (targeting all teachers who needed to upgrade their knowledge level and teaching methods); and
- conducting inservice management training for school principals.

The CTVTC was set up, then, to provide the following training courses: 1) secondary teacher training programs for unqualified primary school teachers; 2) tertiary teacher training programs for unqualified secondary school teachers; 3) continuing education courses for professional improvement; and 4) management training programs for principals. In practice, the CTVTC focused its efforts on the first two dimensions.

The CTVTC awarded "subject area certificates" upon satisfactory completion of each course. If the trainee failed, s/he had to wait until the course was offered again, which sometimes took two or three years. This

flexible system allowed students to pursue only the courses they lacked to become fully qualified. For this reason, the duration of study varied by trainee. Some could complete the training in three years while others could take eight years or more to finish all required courses.

CTVTC boasted a number of unique features. First, no entrance exam was required to enter the training program. This opened the door to *all* teachers in the teaching force who needed to improve their qualifications and to upgrade their professional knowledge.

Second, CTVTC did more than just provide courses over the airwaves. It created an entire system to support teacher learning, including printed materials, videotapes, and tutors to meet the different learning needs of trainees. It included live television broadcasts of ETV, as well as prerecorded videotapes for distribution.

Third, the CTVTC relied on existing teacher training institutions and part-time lecturers and experts. This contributed to the quality of the programming and helped reduce costs.

Finally, the CTVTC formed effective partnerships among national and local governments and teacher training institutions to create programming and to finance and deliver training. This structure enabled the program to reach a wide area, including those in remote and rural areas, where a significant share of unqualified teachers was located.

Language issues

Mandarin was chosen as the language of instruction for ETV programs.² Mandarin is the national language of instruction in China and is used in the majority of schools across the country. National language policy does, however, permit the use of minority languages for instruction, particularly in the beginning years of schooling, with the gradual introduction of Mandarin. Because of this, when the CTVTC was initiated,

² Mandarin is the national language of the Han, who comprise 92 percent of China's population. The remaining 8 percent of the population are dispersed among 55 ethnic groups.

there were many minority teachers whose level of Mandarin was not good enough to understand the ETV programs. Some local governments responded by translating the ETV programs into minority languages. Most commonly, the ETV programs were presented in Mandarin, and bilingual tutors would explain the content. Minority trainees were also permitted to take examinations in their native language.

National programs vs. local concerns

As ETV got underway, all programming was centrally produced. In time, local areas saw the medium as a way to address their specific needs. As local technology skills improved, locally-produced programming began to supplement sections of centrally-produced programming with more relevant local content. In this way, the use of central programming was maximized and communities could focus on their particular concerns.

Administration and organization

National and local partnerships

THERE ARE FIVE LEVELS of government in China: national, provincial, prefecture/municipality, county, and township. From its inception, government ministries and education institutions at all levels worked in partnership to provide ETV programming.

The role of the national level

At the national level, nine ministries were involved in the initiation of ETV teacher training:

- State Education Commission
- State Planning Commission
- State Economic Commission
- State Committee of Science and Technology
- State Council Technology Office
- Ministry of Finance
- Ministry of Broadcasting, Film and Television
- Ministry of Personnel
- General Bureau of Customs

Their respective tasks were specified in the document, “Announcement on Utilizing Satellite and TV on Education,” issued prior to the official establishment of the CTVTC. Essentially, the central government role encompassed getting programming “on the air,” which entailed purchasing a satellite transmitter, ensuring the delivery of imported equipment, operating ETV channels, and developing ETV programs (detailed below). The programs were transmitted via China Education Television (CETV), which was established in 1986.

The CTVTC was primarily responsible for program development, with oversight from the State Education Commission. Its tasks included:

- making long-term and annual plans for ETV;
- developing teaching plans to be implemented nationally;
- organizing and developing ETV programs and teaching materials;
- distributing videotapes of programs; and
- disseminating “best practices” across the nation.

Though the CTVTC played a major role in getting educational television for teacher training on the air, it maintained a small staff of only 35. This was possible because it made extensive use of part-time experts, and contracted much of the work to outside companies.

The role of the local level

Once programs had been produced, and the means to air them were in place, the local level was responsible for the “ground activities,” or ensuring that ETV program reached the trainees. This was consistent with the national policy of educational decentralization, in which each level of government was responsible for providing and financing basic education (primary and junior secondary), including teacher training. Provincial education commissions provided overall coordination of ETV training at the local level through the special Office of Satellite Television Education. These commissions set local policy and determined levels of investment. Municipalities, counties, and townships were mainly responsible for managing the ETV training—providing necessary resources, facilities, equipment, personnel, and the means to ensure that programs reached trainees. Specifically, local functions included:

- developing provincial teaching plans based on those developed at the national level ;
- publishing and printing teaching materials;
- providing guidance to teacher training colleges and schools;
- designing and organizing examinations; and
- conferring diplomas and certificates.

In general, government agencies at all levels financed the ETV program. This included purchasing equipment, establishing local TV and relay stations, and equipping teacher training institutions with televisions. Teacher training institutions took responsibility for organizing and administering actual training activities. This is more clearly spelled out in the following section.

Structure of the CTVTC

ETV teacher training was designed to take advantage of the existing inservice teacher training system. In this system (see Figure 1), prefecture/municipal education colleges provided training for junior secondary school teachers, and county teacher training schools assumed the training of primary school teachers.³ Under the CTVTC, these colleges and training schools were known as “organizing institutions” because they took responsibility for organizing training and related activities. The organizing institutions hired teachers, handled students’ admission and registration, set up tutorial activities, organized watching schedules and discussions, and arranged examinations. The system was flexible enough to allow county teacher training schools to provide, where appropriate, teaching units for secondary school teacher in addition to training for primary school teachers.

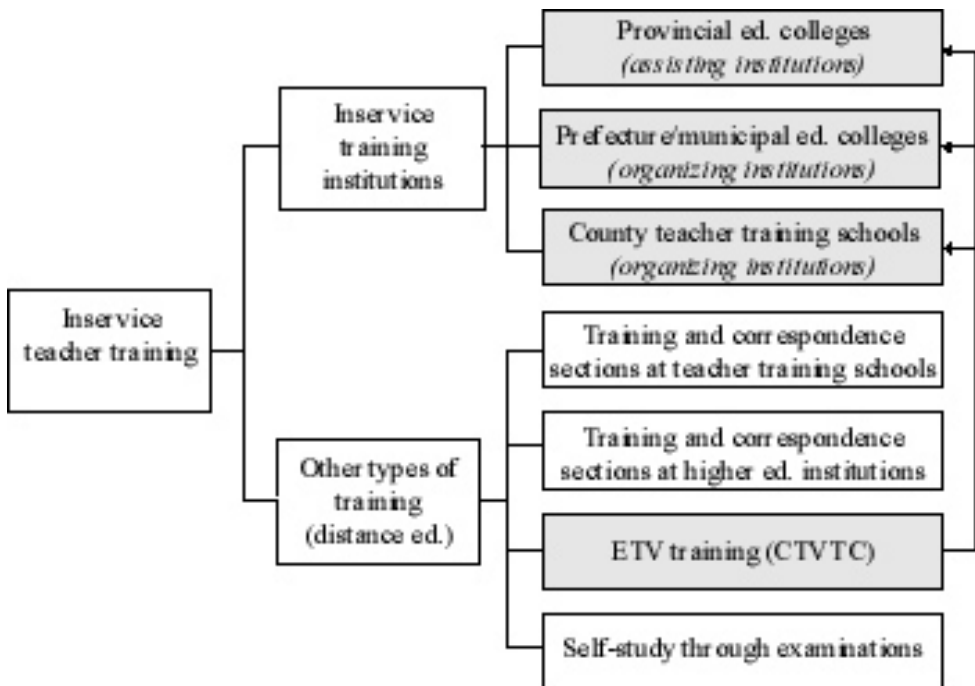
Provincial education colleges, though not directly involved in ETV training, were identified as CTVTC “assisting institutions.” They served two functions: to provide professional guidance to both municipal and county teacher training colleges and schools, and to train the tutors at these institutions on a regular basis. This training ranged from subject matter courses to teaching methodology and problem solving skills.

An important component that was added to the existing training system was the viewing center. This was established to provide access to

³ As of 1996, there were 207 prefecture/municipal level education colleges and 2031 county teacher training schools (DTESEDC).

those in remote areas. With the introduction of viewing centers, trainees who registered at “organizing institutions” could attend organized ETV program and tutorials near home, rather than travel to far-away schools for these purposes. In later years, CTVTC also linked with self-study programs that enabled trainees to earn credits and gain subject certification by passing self-study examinations.

Figure 1: Structure of inservice teacher training in China



Sources: Field data and Department of Teacher Education, State Education Commission, 1996. Teacher Education in China. Shanghai Scientific Technological Education Publishing House.

The role of tutors

Tutors played a crucial role in ETV training. Their responsibilities included face-to-face instruction, responding to questions, correcting homework, and organizing class discussions. They also led study groups and tutorials in viewing centers, and developed self-study materials for trainees. There was no fixed ratio between tutors and trainees. Usually,

one tutor was responsible for one or two groups of trainees from each neighborhood or viewing center.

One of the most important functions of tutors was to decide which ETV programs, in part or in whole, trainees should view. To ensure the consistency of content in the province for the purpose of provincial examinations, initially the provincial educational commission selected programming. Tutors would then decide which parts of the program to show, based upon their own assessment of trainee needs. Because they held a position of importance that gave them power to determine what trainees would be taught, it was an honor to be selected as a tutor. Tutor candidates were required to:

- have mastery of Mandarin and, where necessary, a minority language;
- possess a university degree;
- be highly experienced and well regarded in his/her field;
- be willing to teach at a TV college or school; and
- be willing to teach at a CTVTC organizing institution.

Tutors had additional responsibilities, including visiting trainees' study groups on a regular basis to help trainees with problems. Through this activity, they learned which specific questions trainees might have and could prepare their tutorials accordingly. Whenever necessary, tutors organized model lessons for trainees. These were given by local teachers to demonstrate how teaching methods describe in the textbooks could be applied in practical teaching. This role was described by some at Gao Bei Dian Teacher Training School as "helping (trainees) get on the horses and escorting them for a while."

Recognizing the importance of tutors, many organizing institutions required them to prepare for their tutorials. Most often, several tutors would meet together to view an ETV program, study the accompanying textbooks, and judge which parts of the program would be appropriate for their trainees. When they had questions that could not be answered within

the group, they had access to higher level teacher training institutions. As noted above, regular upgrade training was also available for tutors twice a year at Provincial education colleges.

Curriculum and programming

Curriculum and program development

ETV PROGRAMMING FOLLOWED the national curriculum for teacher training, including instruction in practical teaching skills. Often, the CTVTC constructed lessons from actual student textbooks. In this way, trainees could apply the knowledge and methods learned from ETV programs directly into their teaching practice. One of the reasons for the success of ETV was the fact that the CTVTC used the highest quality resources in creating and producing programs. More specifically, CTVTC identified top lecturers, engaged the most experienced curriculum experts, and partnered with the best production companies.

Best key lecturers

The importance of top-level lecturers to ETV cannot be over emphasized. Their knowledge, attitudes, and methods had a significant impact on trainees. Over the years, 300 experienced and highly respected professors from a wide range of subject areas served as CTVTC key lecturers. All professionals were chosen according to four criteria:

- fluent in standard Mandarin Chinese;
- recognized subject area experts;
- demonstrated mastery of teaching methods; and
- ability to demonstrate and perform in front of video cameras.

The CTVTC required that lecturers meet all standards, and not only those related to professional knowledge. Experience had shown that an excellent scholar was not necessarily a good instructor. For this reason, many lecturers were chosen from teacher training institutions. These professionals were most likely to possess the requisite subject matter knowledge and the ability to teach it.

Best written materials

The CTVTC was highly selective in its choice of professionals to develop the textbooks and written materials to accompany ETV programs. They were chosen from among the most experienced curriculum experts and professors from established teacher training universities and publishing companies across the country.

Best production partners

Recognizing the importance of quality production, the CTVTC chose to work with production companies that possessed the necessary advanced equipment, techniques, and skills. This was done through a nationwide tendering process: candidate companies were selected to make 15-minute demonstrations on designated programs to a committee comprised of experts. The CTVTC chose those who demonstrated quality work at the best price. Over the years, 150 production companies were involved in the production of CTVTC programs.

Courses offered

With the help of professional subject area experts, the CTVTC developed a broad range of courses. For primary school teachers, the CTVTC offered the 16 required courses for qualification: selective reading and writing; basics of Chinese language; language teaching methods; basics of arithmetic theory; algebra and basic functions; geometry; mathematics teaching methods; educational psychology; pedagogy; basics of natural sciences; history and geography; music; arts; physical education; nature teaching methods; and health education.

The CTVTC also offered courses in 12 majors for secondary school teachers: political and moral education; Chinese language and literature; English language; history; mathematics, physics; chemistry; biology; geography; music; physical education; and art. Courses for both primary and secondary teachers were organized according to the following

framework: education theory, 10 percent; professional knowledge, 70 percent; local content, 15 percent (if appropriate); and education practice, 5 percent. The local curriculum, determined by local education commissions, was supportive of practical knowledge-building related to local needs (SEDC, 1992).

Production and transmission

Production

CTVTC PROGRAMS WERE produced both in the studio and in the field, depending upon the course. For example, courses such as mathematics, language, and music were studio-based; these accounted for the majority of programming. Production of courses such as physical education obviously took place in the field. Chemistry and physics courses were produced in science laboratories.

As mentioned earlier, the CTVTC contracted outside companies for production work. Still, to ensure the quality of programming and its consistency with curriculum objectives, the CTVTC staff maintained an active involvement in program production and design.

As local areas developed their technical and professional capacities, they began to develop their own programs to complement centrally produced ones. Most locally developed programs focused on model teaching and subject matter that were relevant to the local situation such as those related to agriculture. By project's end, more than 70 percent of the counties had TV centers capable of producing their own ETV programs.

Transmission

In large part because of satellite technology, China has established the largest national ETV transmission network in the world. The CTVTC benefited from this network, transmitting its programming through four channels via Central Education Television (CETV). CETV-1 was launched in 1986 with comprehensive education programming, including continuing education courses. CETV-2 followed in 1988, transmitting CRTVU and teacher training programs. In 1994, CETV and Shandong Education Television joined to form CETV-SD, whose programming focussed on primary and secondary school teacher training. Its signal reached beyond China to the neighboring counties of Japan, Korea, and

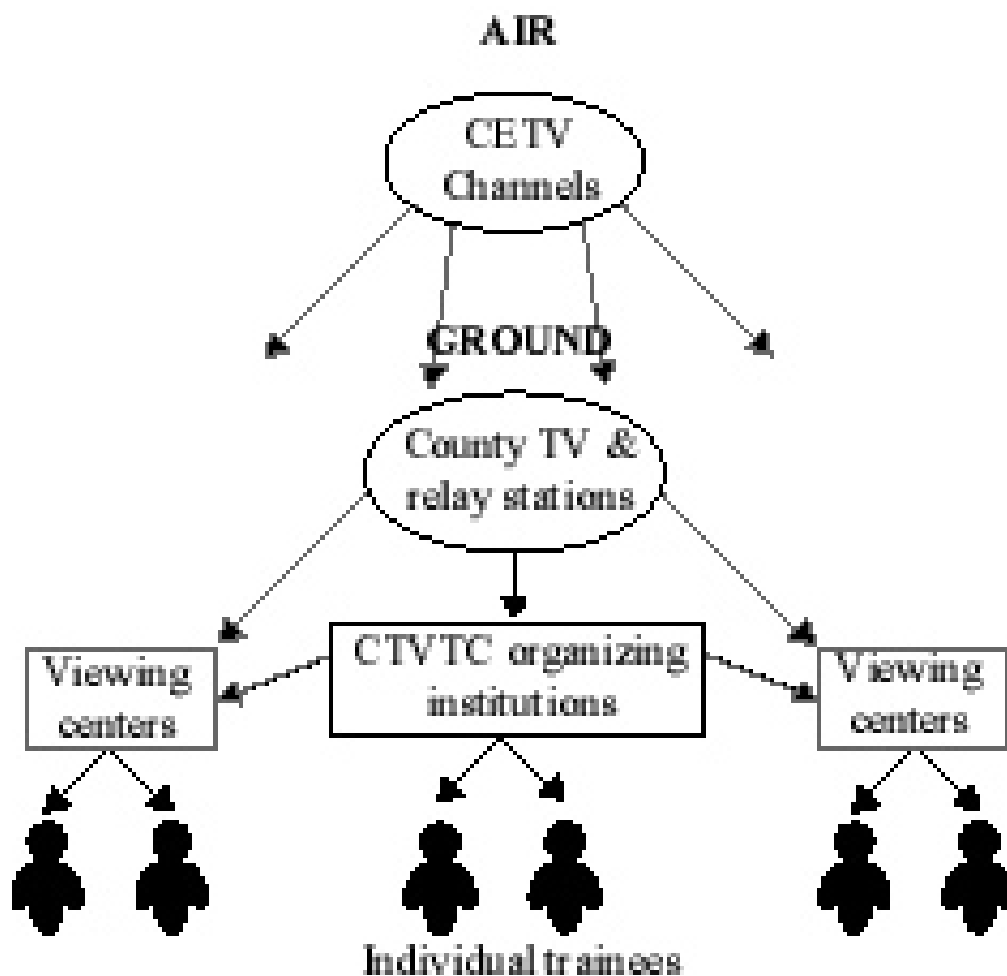
India. Finally, CETV collaborated with Beijing UHF 35-cable TV, to form CETV-BJ.

At the local level, programs were transmitted through a network of local TV and relay stations. There were approximately 800 county level TV stations, 10,600 relay stations and 66,000 viewing centers all over the country. Lack of access to a television set was never a problem; they were available at each school, and 80 percent of Chinese households had television sets by the mid-1990s.

Partnerships among the national and local levels of government and teacher training institutions played a key role in the transmission of ETV programs. ETV would have had a very limited impact without local collaboration and inputs. Figure 2 demonstrates a simplified delivery system distinguished by “Air” (roles played at the national level) and “Ground” (responsibilities taken by the local government and teacher training institutions). As this figure illustrates, the central government provided a satellite transmitter, operated CETV channels, and developed ETV programs. The CTVTC training programs were then transmitted through the four CETV channels mentioned above. After these programs were “on the air” it was up to the local governments and teacher training institutions to deliver them to individual trainees.

At the local level, county TV stations and relay centers would record the CTVTC programs. Stations would then retransmit/replay these programs, together with locally-produced programs, to CTVTC organizing institutions (or teacher training schools), viewing centers, and individuals who wished to use them. The expenses for establishing local TV stations, relay centers, as well as purchasing equipment and facilities for schools and viewing centers were all managed locally.

Figure 2: Delivery system of ETV



Implementation

TWENTY YEARS AGO national teacher training programs were implemented without much variation because they were all centrally developed and administered. This changed dramatically in the 1990s due to the policy of decentralization. Indeed, variation was commonplace in the implementation of teacher training under the CTVTC. For this reason, detailed information on how the program was implemented was not readily available from the CTVTC central office in Beijing

Variations between provinces

Decisions on how to implement ETV training were made at the provincial level. Provinces decided when to introduce ETV programs, how much to invest, whom to select as tutors, what materials to use, and how to organize teaching and learning. Two provinces, Shandong and Hebei, illustrate the resulting differences in implementation.⁴

Schedules

One clear difference between Hebei and Shandong Provinces was the training schedule. In Hebei, trainees were on a year-round schedule and were required to devote six hours each weekend to watching training videos. Shandong Province was on an intensive vacation training schedule, wherein the trainees met only during summer or winter vacations for six hours daily, for 30 to 40 days.

Fees

Large variations were found in the fee schedule. It differed from one school to another, one province to another (depending upon financial

⁴As is often the case, data on investment in training was not available. In part, this is because the ETV training involved multi-levels of inputs and it was not easy to distinguish one contribution from another.

capacity) and even from one major to another. For instance, a science major involved labs, which was more expensive than a liberal arts major. In general, local governments shouldered the cost of training. However, there was a difference in how each made reimbursements: some provinces provided trainees an immediate full reimbursement, while others made it contingent upon completion of study.

In both Hebei and Shandong Provinces, the government paid all trainees' expenses, with the exception of textbooks. However, each province dealt differently with dropouts. In Shandong, if a trainee dropped out of the program s/he was required to repay the entire amount of the fees. In Hebei, the trainee's school would be held responsible for the bulk of the fees, while individual trainees were obligated to a minimal repayment. These policies may have encouraged teachers in Hebei to pursue training opportunities, while only the most serious in Shandong Province would be willing to take the risk.

Centrally vs. locally produced materials

The extent to which centrally developed materials were used by individual schools also varied between the provinces. For example, Tai An Education College in Shandong Province primarily used ETV programs and videotapes developed by the CTVTC. The decision to rely more heavily on centrally produced programs was based on the belief that they engaged the most famous lecturers and therefore provided the best quality programs. In contrast, Hebei Province used proportionately less CTVTC programming in local schools than did Shandong. This might reflect the greater degree of autonomy given local schools by the province.

Increasing focus on secondary teacher training

During the first four years of the CTVTC program, the teacher qualification rate grew rapidly. The most visible achievement was in primary education. Whereas in 1985 only slightly more than 60 percent of

teachers had met qualification standards, this had risen to nearly 81 percent by the end of 1991. The qualification rate of secondary school teachers lagged behind at 51.8 percent in 1991 (though up from 27.5 percent in 1985) (SEDC, 1992).

As a result, in 1992 the government mounted a massive effort to accelerate the training of secondary school teachers. To hasten this training, the national government created a special policy to join the three existing means of distance learning for teachers (SEDC, 1993). This policy brought together the CTVTC with correspondence programs and self-study examinations (see Figure 1).

Traditionally, the correspondence program had its own system of admission, courses, and examinations. Because teachers could participate without leaving their jobs, many enrolled. However, the pass rate was unacceptably low. The new policy meant that teachers already enrolled in the correspondence program could now also earn ETV credits. Those who chose this option gained access to CTVTC programming and teaching materials. Their graduation was then based on the self-study examinations. Through this system, the national government hoped to ensure the quality of teacher training as well as to increase the numbers of teachers trained. The idea was to build upon the strength of each of the distance education programs. Self-study examinations were known for their difficulty, and, as discussed above, ETV was recognized as a highly effective training program.

This policy had a significant impact on trainees' participation. By 1993, 625,000 teachers nationwide were being trained under the new system. In Hebei Province alone, 120,000 secondary teachers received training between 1992 and 1996. As a consequence, the number of qualified secondary school teachers nearly doubled between 1991 and 1995, rising from 40.56 percent to 80.14 percent.

The trainee experience

Participating in ETV training was by no means a simple undertaking. It required commitment, dedication, and sometimes sacrifice. Trainees had to be highly motivated. Many said they were motivated by the fact that national policy now linked promotions to teacher qualification, regardless of teaching experience. As an added incentive, teachers who received their training through distance education were treated the same in terms of salary and promotion as those who had been trained through conventional means. At the same time, the government made clear that teachers who were not qualified would gradually be replaced by those who were.

The following trainee schedule in Gao Bei Dian City, Hebei Province, illustrates the enormous amount of time, hard work, and persistence required to complete the ETV program:

Monday	Self-study—one and one-half to two hours daily, including reading
Tuesday	books, reviewing materials and homework
Thursday	
Wednesday	Group Work—one to two hours, with six to seven trainees from nearby neighborhoods. These groups would do homework, discuss difficulties with the material, and prepare for new lessons together
Friday	Do homework
Saturday	Attend “gather-togethers” for instruction with tutors, and watch TV 8:00–11:30 am and 2:30–5:30 PM. The sequence of study was to review the new lesson, discuss difficult points within study groups, watch TV, attend tutorials, and do homework.

To become fully qualified, most trainees required 40 weeks a year of ETV study for at least a period of three years to complete all the necessary courses (assuming uninterrupted study and passing all examinations

on the first try). For a number of reasons, not many were able to complete the ETV training during the designated time. One reason was that many trainees juggled their training courses with heavy workloads at school, as well as family responsibilities.

Another reason was the difficulty of the exams. As discussed above, the CTVTC employed a subject certification system. Once a trainee passed the examination, he/she was qualified in that subject area. In practice, not many trainees passed their examinations the first time and had to repeat them. Most passed the second round, although some had to sit a third examination.

Achievements and challenges

ALTHOUGH ETV HAS NOT BEEN systematically evaluated, the program can claim success in a number of areas. In general, trainees felt that it helped them improve their teaching; many quality programs and training materials were developed; it contributed to a higher examination pass rate; it was primarily responsible for the large increase in the number of qualified teachers; and it was able to provide training at a cost savings. The following section examines these strengths, as well as weaknesses of the program.

Effect on teaching practice

Most of the trainees interviewed for this paper viewed the ETV program positively. For them, the most compelling factor was the quality of the lecturers and programs. As one trainee from Hebei noted:

The only way for us to have had access to such famous lecturers was through ETV. Even the best teachers in the local schools cannot be compared with them. In addition, these television programs provided us with much more information on teaching methods as well as a broader range of knowledge than we could obtain from other sources. For example, in teaching the course on reading in the Chinese language, the lecturer placed the emphasis on reading, rather than explanation, as we had believed it should be. This method has proved to be an effective teaching tool because it stimulates student learning.

Other teachers also expressed excitement at being able to use what they learned in their classrooms:

I had a student who never listened. He was not active in the class and could not answer any questions. I thought I could not change him. Then I learned from a teaching methods course to look for his

strong points. I discovered that he was good at playing chess. So I played chess with him and he won. I then used this chance to encourage him to study harder. Soon he became more active in class.

The following teacher was proud to be able to learn how to be more than an “ordinary teacher.”

I was an ordinary teacher before attending the ETV training. Through the program, I learned a lot about teaching methods and had the opportunity to attend model teachers’ lessons. As a result, I am now a model teacher.

Program and material development

During the course of the project, the CTVTC produced a large number of quality ETV programs. To accompany the programming, the People’s Education Press, together with Higher Education Press and the CTVTC, developed highly effective teaching materials. Table 1 details these courses and teaching materials.

Examination Pass Rate

Though there was never a systematic evaluation, the CTVTC conducted periodic reviews of the ETV program. In 1990 it did a random survey of examination pass rates of 105,000 CTVTC graduates from 13 cities (see Table 2). In three courses (natural science basics, ancient Chinese literature, and mathematical analysis), nearly three-quarters or more of the students passed. Over one-fifth of natural science students, one-third of Chinese Language students, and one-half of students in mathematical analysis achieved an excellent pass rate.

Table 1: Courses and Teaching Materials Developed for ETV

	ETV program		Teaching Materials	
	No. of Courses	Hours	No. of Courses	Copies
Training of Primary School Teachers	16	1,155	16	1,170,000
Training of Junior Secondary School Teachers	130	8,000	183	13,400,000
Training of Primary and Secondary School Principals	10	725	12	2,000,000
Continuing Education for Secondary School Teachers	—	2,050	—	—
Continuing Education for Primary School Teachers	—	1,172	—	—
Total	156	13,102	211	16,570,000

Sources: Xie, Yunjin. *Recent Development of Satellite Normal Education in China*. China Central Radio and Television University. Paper submitted to CTVTC.

Table 2: Sample of Survey of Results of Examinations for CTVTC's First Year Graduates

Levels/Subjects	Number of cities	Number of trainees	Pass rate	Excellent rate
Secondary program/Natural science basics	10	90,000	73.1	22.6
Tertiary program/ Chinese language education, ancient Chinese literature	9	14,000	84.8	38.9
Tertiary program/ Mathematics education, mathematical analysis	7	1,600	81.7	54.1

Sources: CTVTC. Introduction to the achievements of satellite television education on teacher training. The author.

Costs

Detailed cost data were difficult to come by because of the myriad levels of government and educational institutions involved. However, it is clear that the program realized significant cost savings over conventional teacher training institutions. First, the CTVTC took advantage of existing education institutions and their resources. Second, the program did not bear the cost of residency, student salary allowance, and the use of school facilities, as did its conventional counterparts.

Number of teachers trained

In its 10-year history, the CTVTC made a critical impact on teacher training in China. According to the Education Technology Commission, the inservice teacher qualification rate in primary schools increased at more than 10 percent every five years between 1986 and 1995. That is to say, it rose from about 63 percent in 1986, to 74 percent in 1990, and finally to 89 percent in 1995 (ETCSEDC, 1996). By 1998, 710,000

primary and 550,000 secondary teachers had graduated from the CTVTC. In addition, the program provided upgrading training for two million primary and secondary teachers and one million principals (CTVTC, 1995).

Challenges

Overall, ETV was considered a great success in China. Still, the program did encounter a number of problems over the years. These related to the trainees themselves, program design, evaluation, and availability of resources.

As discussed above, the trainees undertook an enormous burden when they enrolled in the CTVTC. It required a minimum of an extra 20 hours of work each week. Trainees expected their principals to encourage and support them in their pursuit of a credential. Specifically, they expected that their principals would allow them to leave school earlier to attend study group activities, and to assign them reasonable workloads. However, principals were not obligated to do this, which created difficulties for some trainees.

Moreover, completing ETV training proved to be even more difficult for those who had heavy duties at home. For example, there were some trainees who were obligated to care for small children or aged parents in addition to their homework, examinations, and full-time teaching loads. As a result, many trainees completed the program in five years instead of three. It is an indication of their commitment that they were able to do so under such unfavorable circumstances.

The program's design also posed problems. Specifically, tutors complained that many centrally developed programs did not emphasize difficult points but wasted enormous amounts of time on easier points that trainees already knew. As a consequence, tutors had to compensate. This represented in part the CTVTC's failure to understand the knowledge level of trainees, and in part the inability of a national program to respond to the specific needs of each area.

Evaluation was one of the most striking weaknesses of the program. Though systematic evaluation had been written into the original program design, in fact it was done more on an ad hoc basis. On paper, 700 feedback units had been established, but these clearly did not function as intended. The difficulty in locating relevant and consistent data on ETV was a reflection of this problem. Often, evaluations completed by trainees and tutors did not reach the CTVTC in a timely manner.

Although the cost of ETV was far below that of conventional teacher training, a shortage of resources remained a problem for many in the poorest areas.⁵ Local governments here were not able to purchase the necessary equipment and facilities to receive CTVTC programs. In addition, many of them were not able to equip county TV stations, an important linkage to deliver CTVTC training to trainees. (ETCSEDC, 1996).

⁵ Lack of resources did not appear to be a problem for Hebei and Shandong

Conclusions and future prospects

Conclusions

A NUMBER OF FACTORS ACCOUNT for the success of ETV training in China. First of all, the Chinese experience underlines the importance of sustained government support and commitment. Support from the ministries ensured that the CTVTC had the necessary equipment, personnel, and funding to get underway. National policy was also instrumental in involving local governments, as well as encouraging trainees to enroll in the CTVTC program.

Second, collaboration between the national and local levels of government was a significant feature of the project. Specifically, the national level took responsibility for program production, while the funding and organization of training activities fell to the local levels. This strategy, in line with the country's decentralization policy, recognized the potential of each level of government and held them accountable. Local initiatives were not limited to resource generation, but also involved curriculum development. By project's end, fully 15 percent of the ETV programs were made locally. In addition, the sophisticated delivery system, designed to reach even those in rural and remote areas, was made possible through joint national and local efforts.

Third, the CTVTC took advantage of existing resources. As illustrated above, the program relied on existing education institutions for organizing training activities instead of creating a new system. The CTVTC also identified expertise from throughout the country to develop curricula and to act as program lecturers. This ability to "share national resources" contributed to both the quality of the program and lowered costs.

In the end, probably the most important reason for the success of ETV was its reputation for quality. Trainees uniformly cited this as the factor that drew them to ETV. They especially valued the opportunity to

have access to national level experts, which is one of the major reasons why they preferred ETV to other forms of distance learning.

Future of teacher training and ETV

In 1994, the CTVTC merged with the Central Radio and TV University to become the Department of Teacher Education arm of the CRTVU. This was done to enable the Department to make use of the personnel, resources, and facilities of the CRTVU. The Department now faces greater challenges because the state has raised standards for teachers' qualifications. By the year 2010, primary school teachers in selective, economically advanced areas will be required to have completed tertiary level teacher training. At the same time, all junior secondary school teachers will be required to have diplomas from four-year universities. This clearly will require a large effort to train current teachers who do not meet these standards.

Given this landscape, the Department of Teacher Training has an even greater role to play in the future. Its new responsibilities are to:

- provide training on teaching methods to inexperienced teachers;
- upgrade teachers' academic qualifications according to the new standards;
- introduce new information and technology to classroom and teachers;
- continue training teachers in remote and poor areas; and
- train school principals in school management.

The CTVTC has proved that ETV is an efficient delivery system for teacher training. While television will likely remain the primary instrument of distance education for years to come, new technologies are emerging that can also be used for training. VCD and DVD are becoming popular in many economically advanced areas. The fact that computers are now more widely available both at school and in homes increases the options for training. The challenge, then, for China is how to take the op-

portunity that new technologies provide to meet the increasing demand for quality and diversity of teacher training. Of equal importance is the need to strengthen local financial and institutional capacity in disadvantaged areas, to ensure that teachers in poor and remote areas also gain access to the new technologies, so that they will not be left behind.

Afterword: School television in the twenty-first century

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THE IMPROVEMENTS in the medium of television over the course of the past half century have been truly remarkable. In the 1950s, the medium was monochrome, restricted largely to “line of sight” reception within a limited geographical area, not recordable, capable only of one-way transmission, and very expensive to produce. By the 1990s, television had developed a high definition signal with accurate color rendition, could be delivered across vast distances by a variety of different technologies in ways that preserved the fidelity of its signal, could be tape-recorded for convenient later use, could provide “interactive” capability on two-way transmissions, and could even be produced on very modest budgets. As we begin a new millennium, we are about to experience perhaps the most significant technological advance of all, the widespread digitization of television in a high definition format. Digital television promises to be clearer, capable of more dynamic special effects, reproducible without signal degradation, and easier to edit.

Were we to obtain and view some educational television programming from the 1950s, most of us would be amused at how “primitive” it would appear compared to much of the programming available today. Those programs from fifty years ago would seem barely representative of what can be accomplished with the television medium today. Yet much of the literature about television as an instructional medium dates back several decades, and it examines a form of the medium that has been vastly altered. It is time for a new review of educational television—to explore its present potential at the beginning of this new millennium.

Technological transformation of television

A brief review of the technical transformation of television in the second half of the twentieth century will help readers appreciate how much more dynamic the medium is now than ever before. What began as a black and white signal today provides accurate color signals representing every nuance of the rainbow. The grainy picture of the past has evolved into the remarkable clarity of high definition television (HDTV), which approaches that of motion picture film. The tinny, monophonic TV sound has been transformed into the hi-fidelity stereo sound we hear today on our TV speakers—or better yet through our stereo systems. Today, television’s image and sound quality has the ability to capture and hold the attention of students as never before.

Television in the 1950s was broadcast from a transmission tower with line-of-sight coverage, whose signal strength weakened across distance and was subject to interference. It rarely reached very far beyond the confines of major metropolitan areas. Today, television is transmitted via a variety of technologies that can send it much further and still preserve its signal strength. A single satellite’s transmission “footprint” can cover one-third of the Earth and, by relaying signals, today’s global satellite configuration can provide nearly instantaneous worldwide viewing of a given event. Microwave dishes only a meter across can process satellite signals for very clear reception of large numbers of channels. Coaxial cable can carry multiple television channels with fine reception, and cable made of optical fiber can transmit even more channels with higher signal quality. With these advances in transmission technology, more channels with more varied programming are available today in nearly every corner of the globe. The bandwidth and broadcasting time is available to provide millions of students with programming in a wide variety of subject areas.

Television screens in the 1950s were restricted in size, due to the limitations of cathode ray tube technology. Today television is watched on wider TV sets, on big, flat liquid crystal-based “plasma” screens, and via

projection systems that greatly enlarge the image. Television has thus evolved into a medium that can be viewed clearly by the average classroom student, even from the back of the room.

The original forms of television could not be very easily preserved. Now TV can readily and automatically be recorded on tape for playback at the convenience of the viewer, through the use of videocassette recorders (VCRs). For this reason, scheduling problems are no longer a major impediment to utilization of television in the classroom. VCRs also provide a variety of playback features that teachers can use in presenting television footage to a class. Videotape can be found in even the most remote parts of the planet, due to the popularity of movies on tape.

Now television is also available on a compact disc, the Digital Video Disk (DVD), which can play back several hours of good quality television as a result of improved video compression techniques. Disk also allows for clearer viewing of still pictures and very rapid random access of such stills. Since one hour of video can hold over 100 thousand stills, it has enormous potential as a storage medium for educators.

In its first few decades, television was mainly produced in studios with expensive equipment by a group of trained professionals. Today television of reasonably high quality can be produced by one person in nearly any location with relatively inexpensive equipment. The quality of cameras has improved even as their price has come down. The replacement of tubes with solid state technology has led to smaller, lighter, more durable cameras that are more sensitive to light. Most camera controls are now highly automatic, and the inexperienced videographer can often shoot fairly respectable-looking footage. For all of these reasons, educational programming can now be produced at lower cost than ever before.

To produce a program from raw footage, an editing system is essential. A few decades ago, no school could afford an editing system. But low cost editing systems have become widely available. Small editors can be connected to a pair of camcorders or VCRs, and footage can be assem-

bled into a program. The digitization of video and availability of video editing software has allowed for the editing of television footage on computers. Teachers and students can now take video footage and arrange it into programs on microcomputers. As with word processing of text, digitization provides considerably more flexibility in the arrangement of shots than was ever before possible.

School television has therefore become a production medium as well as a playback medium. Even students can shoot their own footage with school camcorders. Working on their own productions can help students develop some important skills: researching, writing, scripting, visual literacy, sensitivity to the impact of music, organizing, working with others, equipment proficiency, and an opportunity to be creative.

Instructional television in the developing world

While developing countries may not be in a position to take full advantage of all of television's most recent technological advances, they can certainly benefit from the ongoing improvements in capability. The television broadcasting systems of many developing countries are currently superior to the television that was broadcast in the United States just a few decades ago. In the same way, the production of school television programming in these countries has improved, as a result of the availability of better equipment for shooting and editing television footage. Schoolchildren in many developing nations can therefore benefit from the more dynamic instructional broadcasting produced in newer, better studios.

In some developing countries, television broadcasts may still be available only in urban areas. But the pace of urbanization has increased to the extent that a large percentage of the population now lives in these areas. Consequently, television now reaches millions in their homes and holds the potential to reach thousands of schools. Moreover, the costs of VCRs have decreased to levels where a unit or two is an affordable propo-

sition for many schools, even in the developing world. Camcorders are also getting cheaper all the time. Television is thus gradually becoming a medium that even poor schools around the world may be able to afford, in some form, in the not-too-distant future.

If school television is to take advantage of the potential of the medium, what are the critical challenges that it must face in the new millennium? The next section explores some of the issues that have confounded school television efforts of the past, to see how they might be addressed by educators who hope to use television in meaningful ways in the future. It also revisits the China Teachers' College project, using it to illustrate good project design and implementation.

Addressing a variety of audiences

School television efforts in many developing countries are conducted within complex social and cultural milieux. One critical issue that has emerged is the language that is to be used in the programming. Most developing countries are multilingual, and in some the different linguistic groups are so numerous that no one language is spoken by the majority of the population. Identifying a national language can become an important political issue. In other countries, where the majority does speak a given tongue, minorities may object to being forced to use that language. To further complicate the situation, in many cases a European language was introduced during a colonial period. This colonial language is commonly used in government, broadcasting, business, and in international relations, not only with the "mother country" but in dealing with other nations. Often it becomes the official language, even if the most widely spoken indigenous language has been designated the national language.

Millions of schoolchildren throughout the world, therefore, are taught in several different languages as they proceed through the educational system. They may grow up speaking a local language, which is used in the early primary grades. Simultaneously, they may also be taught the

country's national language. Finally, if they have further educational aspirations, they will need to learn the colonial European language, which is generally the language used to teach all subjects in secondary school and college. In most cases, the language of school television broadcasts is either the national language or the official language. Students who are not proficient in these tongues may fail to benefit from the instruction provided.

How can school television efforts of the future be more flexible in their approaches to the language issue? One way might be to use the capability of many television formats to record separate audio channels. Different versions of a program's narration can be recorded on separate tracks. Instruction could thereby be delivered in a local language so that the material would be intelligible to young children who are only proficient in that language. Translating and recording a second language on an existing video is not an especially expensive proposition, and it could be a very cost-effective approach if it makes the programming suitable for many more pupils. As we saw in the case study above, China Television Teachers' College considered the language needs of minority students and provided translations for groups in remote regions of the country.

Related to the language issue is whether the educational television programming available addresses issues relevant to the schools and communities in which it is shown. Programs produced in other countries may not be appropriate. Even programs produced in the nation's capital may appear quite alien, or even offensive, to those in remote rural areas, where issues and perspectives may differ considerably.

The most effective strategy in these cases may be to give local groups some access in order to produce their own programming. The fact that equipment prices are falling makes this option more feasible than in the past. Such an approach would serve to empower individuals and small groups, so that they need no longer rely upon national technical specialists and educational bureaucrats who may not share their concerns or under-

stand their perspectives. This strategy was pursued in China, where regions and localities created their own programming to supplement that provided from Beijing via satellite.

Project administration

Some large-scale school television projects of the past were not managed effectively, and their failure has given school television a bad reputation. When school television is attempted on a large scale, organizational administration is obviously extremely important. It is not enough to find money, equipment, and personnel; organizing the effort and coordinating the activities of a variety of different organizations, and the professionals within those agencies, is also critical. The production, dissemination, and utilization of school television productions can involve students, teachers, principals, curriculum specialists, ministry of education officials, television producers, engineers, administrators in broadcasting units, and ministry of telecommunications officials, among others. International assistance consultants might also be sent by various funding agencies, with their own opinions about how to run the project.

There are other important elements to good project administration. Gaining cooperation from important political figures is one. Meeting certain deadlines so that expectations are fulfilled is another element that sometimes goes awry. Finally, evaluating and documenting the effort in order to learn from mistakes as well as to record project accomplishments, are also components of project success.

Our case study of the China Television Teachers' College examined a very large project, involving several million teacher trainees. This project included eight different national ministries in the planning process: Education, State Planning, Science and Technology, Communications and Post, Film and Television, Finance, Personnel, and Customs Bureau. It operated at five different governmental levels: national, provincial, county, municipal, and township. How then, despite its size and complex-

ity and the centralized political milieu in which it functioned, did the project successfully train large numbers of teachers?

One key strategy was to develop a sensible division of labor between different agencies at the national level. The project was able to take advantage of the expertise of many different ministries, without becoming mired in bureaucracy. It also encouraged participation from many different outside players, rather than relying solely on its civil service. For example, the television program concepts and scripts were developed by a centralized staff, but were actually produced by a variety of smaller production units, some of them commercial enterprises that competed for the contracts to do so.

Another successful strategy was to allot an appropriate amount of responsibility to agencies at each government level. The national government did not attempt to run everything from Beijing, a task that probably could not have been done effectively or efficiently. This approach alleviated some of the administrative burdens facing those at the central level, while permitting local input and appropriate variations in the way the project was managed at the local level. It also took advantage of existing local resources. For example, the China Television Teachers' College supervised the satellite transmissions at the national level, but the project relied upon local trainers to recruit participants, supervise the class sessions, hire tutors, oversee the testing, etc.

Program quality

The quality of an instructional television program will significantly affect how students respond to it. Some programming is educationally valid but dull. The production techniques are unimaginative. Other programming fails in a different way: the programming is lively, but it does not communicate effectively; it is engaging, but superficial. The result is that the educational content is ineffectively communicated. Creatively combining good instructional design with engaging production techniques

is the key to developing effective school television. It requires the best efforts of both educators and television producers.

Because the equipment for producing good video programming is far less expensive than it used to be, lively, well designed programming can now be produced on far smaller budgets than was previously the case. Consequently, there are now production units all over the developing world that can produce professional looking and engaging programming. Good programming is possible, then, for countries that use their resources creatively, and bring together imaginative educators and professional video producers.

The China case study is an example of how good instruction was successfully translated into engaging, quality television programs. Programs were designed in a way that communicated key concepts associated with a given topic. In addition, methods of teaching were specifically addressed. Moreover the programs' production standards were also quite good. Camerawork and editing were professionally done.

How was this level of quality achieved? Ministry staff, with the assistance of highly qualified teachers, developed scripts that were instructionally sound. Creative videographers suggested lively approaches and ensured that production values were strong. Through its willingness to open the process up to competitive bidding, the project took advantage of the many new creative talents within the video production units now operating within China.

Transmitting and receiving the signal

Ensuring the transmission and reception of the signal has always been problematic for school television efforts. A reliable transmission system must be established to reach the majority of schools. And television sets and videocassette recorders must be available to receive the broadcasts. The challenge is especially great for developing countries where most systems still rely on transmission towers. Cable television is

rare, and satellite distribution is too expensive. But most countries now have equipment sophisticated enough to effectively reach the majority of the population in urban centers, which is usually where the majority of the national population lives.

A more significant problem is the provision of television sets and VCRs in schools. Even in developed countries, not every classroom will be outfitted with such equipment. In developing countries, the situation is far worse, and a small number of sets or VCRs will have to be shared throughout the building. This situation makes scheduling the viewing of educational television an inconvenience.

How were these challenges addressed in China? In terms of program transmission, China may be uniquely suited to take advantage of satellite technology. Satellite transmissions have distinct advantages in terms of breadth of geographical coverage, number of channels, and quality of signal. However, satellite technology is also very expensive. In order to justify the expense, large numbers of viewers across a vast geographical area needed to be reached. China is geographically vast, and it has those large numbers, both in terms of the general population and the number of teachers who needed to be trained. Satellite transmission was an excellent solution for China: the cost per viewer was low because the numbers involved were very large.

But did China have sufficient numbers of receiver dishes, television sets, and VCRs to capture these satellite signals? The fact is that television ownership in China has grown enormously in the past decade—both individuals and institutions have purchased huge numbers of television sets as the country's economy has grown and affluence has spread. Even more importantly, the government has made education a priority and was willing to invest in television equipment for teacher training. Many project participants relied upon institutional equipment, rather than their own television, to obtain the programming. A typical pattern was for trainees to watch videotapes of the programs in group sessions led by tutors who had taped the programming at a local

taped the programming at a local educational facility. In order to finance this equipment, China obtained several large loans from international development organizations, most notably the World Bank.

The teacher's role

The classroom teacher plays a critical role in the school television viewing process. First and foremost, it is the teacher who decides whether a particular program is presented to the class. Much of the time, teachers do not bother to show school television programming. There are several explanations for this: they may not be aware of the existence of programs which might be of interest; they may not see the need for supplementary instruction using television; they may not be impressed with the quality of the programming; or they may not be interested in going to the trouble involved to obtain the equipment necessary for presenting it. Second, the teacher also can play an important part in interpreting explaining the material that is presented.

In the China Television Teachers' project, teachers (or tutors) assumed this second role. Programming was an established, required part of the curriculum, so many of the impediments described above did not apply. These tutors were well qualified, usually faculty from nearby teacher training institutes or highly experienced teachers from the local schools. They performed a number of functions: after presenting the television programs to the trainees, they led discussions about what had just been seen, provided suggestions about teaching based upon their own experiences, collected assignments and gave tests, and provided extra assistance to those who were having difficulty. Essentially, they were responsible for overseeing the running of the project at the local site. The importance of these instructors in helping trainees through the program of study cannot be overemphasized. Without them, the attrition rate for participants would have been much higher.

Curricular issues

One problem faced by advocates of school television has been convincing teachers and students that television can play a meaningful role in the curriculum. Many teachers feel that the textbook contains the critical course information and that television programming has little to add. Indeed, the approach taken by many school television programs over the years has been supplementary, and they have not been especially essential to the course of study.

Another problem has been that, for the most part, producers of television programming have not always taken advantage of television's strengths as a medium. The programs have failed to effectively use the moving visual image to help instruct, so that television has become an expensive way of communicating information that could have been taught as effectively with printed materials. Finally, if the program is primarily a teacher's "talking head," then many classroom teachers will feel that they could do just as effective a job of lecturing, and they will turn off the programming.

Returning to our case study, we find several important reasons why television was a successful mode of delivery in China. The most important is that television could model effective teaching practices by actual demonstrations of how a teacher would conduct a lesson in a real classroom. This was superior to the two print-based alternatives for gaining certification: self-study or a correspondence course. Television, as a medium, could simply involve these trainees more effectively than printed materials.

Another contributing factor to the success of the China project was the incentive of certification it offered to unqualified or underqualified teachers to participate. This certification meant job security and increased pay. There was also a stick in this case—those who were not certified would lose their jobs. Obviously, this audience was highly motivated to complete the course of study and obtain licensure. Unfortunately, this kind

of strong incentive does not usually apply in most school television situations. In fact, as described at the beginning of this section, there are usually several disincentives for classroom teachers, which limit their use of school telecasts.

Evaluation

For a number of reasons, it has been difficult to document the success or failure of school television efforts. There is rarely enough money in the budget for evaluation. Even in cases where an evaluation is done, it is difficult to do properly: reported utilization figures can be unreliable; achievement data may not accurately isolate the impact of television viewing, since it can depend on so many different aspects of an educational experience (and experimental studies that do isolate variables are difficult to arrange and control); and though attitude surveys often show a positive response, liking the programming does not guarantee high usage levels.

If it is difficult to do well, is it worth devoting the time and effort to evaluating the impact of school television? Unfortunately, without some evidence of its potential, school television efforts will meet with skepticism. If a rigorous evaluation is not possible, projects might want to consider at least conducting some inexpensive formative evaluation of their programs. This might include having teachers react to the first few programs in a series to provide feedback. Students can help by responding to short surveys related to programming. Finally, asking small groups representative of the target audience to react to the shows can help with the design of future programming.

The China Television Teachers' College project, like most instructional television projects, had no formal evaluation component. Still, it has documented how many thousands of teachers it has trained. The project's major achievement was to certify so many teachers at a cost far below

what it would have taken to prepare a teacher at a teacher training institute.

Future prospects

This paper has identified many of the factors that have contributed to the success of China's Television Teachers' College project. To what extent can we generalize from this experience? China is unique in some ways. It is a huge country, both geographically and in population, which makes it well suited for the use of broadcasting. Its reliance on satellite transmission is appropriate, because it can reach great numbers across vast distances, and its size justifies the major investment in satellite technology. It is also a rapidly developing country, whose economic resources exceed those of some other developing countries. This means that its television infrastructure is probably growing faster than those of some other poorer countries. Finally, Chinese culture stresses the importance of education, which creates a climate of support for large-scale, expensive educational projects.

At the same time, many of the general conditions that exist in China at the close of the twentieth century are typical of developing nations around the world: limited budgets, unqualified teachers, too few institutions of higher learning, primitive telecommunications infrastructure, etc. If China can run a successful television-based project of this type, it serves as an example to other developing countries around the world of what can be done.

Television is a phenomenon of such enormous popularity that the number of sets continues to grow worldwide. In even the poorest districts in the urban slums of the developing world, TV antennas can be seen on the roofs. Similarly, the use of receiver dishes and VCRs has spread to even the most remote corners of the planet. As time goes by, television is likely to be present in more and more locations; in homes, in bars, and in schools. It is a highly dynamic medium with tremendous instructional po-

tential and therefore should be exploited by every society to help in the education of its children. To ignore the possibilities for the world's least privileged populations would be a great mistake indeed. Determining how to use this powerful medium in a creative yet cost-effective manner should be a priority for educators and governments everywhere.

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